We claim:

1. A library of compounds, wherein each compound in the library is bound to an individual support, each support having associated therewith one or more populations of semiconductor nanocrystals, each population having a distinct characteristic spectral emission.

2. The library of claim 1, wherein each nanocrystal member comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

3. The library of claim 1, wherein the characteristic spectral emission is a wavelength of emitted light, an intensity of emitted light, or both a wavelength and an intensity of emitted light.

4. A method for identifying a compound having a characteristic of interest comprising:

(a) providing a library of member compounds, wherein each member of said library of compounds is attached to a support, and wherein each support also has attached thereto or embedded therein one or more populations of semiconductor nanocrystals, each population having distinct characteristic spectral emissions;

(b) testing each member of said library of compounds to identify compounds having a characteristic of interest;

(c) subjecting each support to a light source to obtain the characteristic spectral emission; and

(d) correlating the spectral emission with the identity of the compound having the characteristic of interest.

5. A method for identifying a molecule having a characteristic of interest comprising:

providing a first library of one or more member molecules, wherein each member of said first library is attached to a first support having attached thereto or embedded therein one or more first populations of semiconductor nanocrystals, each first population having a distinct characteristic first spectral emission;

providing a second library of one or more member molecules, wherein each member of said second library is attached to a second support having attached thereto or embedded therein one or more second populations of semiconductor nanocrystals, each second population having a distinct characteristic second spectral emission, and wherein the second spectral emission is distinct from the first spectral emission;

contacting said first library of molecules with said second library of molecules; and

observing the first and second spectral emissions, wherein said first and second spectral emissions provide information about which of the molecules from the second library of molecules are associated with said first library of molecules, and provides information about the identity of the molecule from said first library of molecules.

6. The method of claim 5, wherein the first library of molecules includes a protein, an oligonucleotide, or a sugar moiety.

7. The method of claim 5, wherein the second library of molecules includes a protein, an oligonucleotide, or a sugar moiety.

8. The method of claim 6, wherein the second library of molecules includes a protein, an oligonucleotide, or a sugar moiety.

9. The method of claim 5, wherein the first support is a first bead.

10. The method of claim 5, wherein the second support is a second bead.

11. The method of claim 9, wherein the second support is a second bead.

12. The library of claim 1, wherein each individual support is a bead, a pellet, a disk, a capillary, a hollow fiber, a needle, a solid fiber, a cellulose bead, a pore-glass bead, a silica gel, a polystyrene beads optionally cross-linked with divinylbenzene, a grafted co-poly bead, a poly-acrylamide bead, a latex bead, a dimethylacrylamide bead optionally cross-linked with N,N'-bis-acryloyl ethylene diamine, a glass particle coated with a hydrophobic polymer, or a low molecular weight non-cross-linked polystyrene.

13. The library of claim 1, wherein at least one compound in the library is a polypeptide, an oligonucleotide, or a sugar moiety.

14. The method of claim 4, wherein each nanocrystal comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

15. The method of claim 4, wherein the characteristic spectral emission is a wavelength of emitted light, an intensity of emitted light, or both a wavelength and an intensity of emitted light.

16. The method of claim 4, wherein at least one member of the library is a polypeptide.

17. The method of claim 4, wherein at least one member of the library is a nucleic acid.

18. The method of claim 4, wherein at least one member of the library is a sugar moiety.

19. A method for identifying a compound having a characteristic of interest comprising:

providing a library of member compounds, wherein each member of said library of compounds is attached to a support, and wherein each support also has attached thereto, embedded therein, or associated therewith one or more populations of semiconductor nanocrystals, each population having a distinct characteristic spectral emission;

subjecting one or more supports to a light source to detect a characteristic spectral emission; and

correlating the spectral emission with a member compound.

20. The method of claim 19, further comprising testing one or more members of said library of compounds for the presence of a characteristic of interest.

21. The method of claim 20, wherein correlating includes identifying a member compound having a characteristic of interest.

22. The method of claim 19, wherein at least one member of the library is a polypeptide.

23. The method of claim 19, wherein at least one member of the library is a nucleic acid.

24. The method of claim 19, wherein at least one member of the library is a sugar moiety.

25. The method of claim 19, wherein each nanocrystal comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

26. A chemical library comprising a plurality of member chemicals, wherein each member chemical is bound to a support, each support having associated therewith one or more populations of semiconductor nanocrystals, each population having a distinct characteristic spectral emission.

27. The library of claim 26, wherein at least one member of the library is a polypeptide.

28. The library of claim 26, wherein at least one member of the library is a nucleic acid.

29. The library of claim 26, wherein at least one member of the library is a sugar moiety.

30. The library of claim 26, wherein each member of the library includes a nucleic acid.

31. The library of claim 26, wherein each nanocrystal comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

32. The library of claim 26, wherein the characteristic spectral emission is a wavelength of emitted light, an intensity of emitted light, or both a wavelength and an intensity of emitted light.

33. The library of claim 26, wherein the each support is a bead, a pellet, a disk, a capillary, a hollow fiber, a needle, a solid fiber, a cellulose bead, a pore-glass bead, a silica gel, a polystyrene beads optionally cross-linked with divinylbenzene, a grafted co-poly bead, a poly-acrylamide bead, a latex bead, a dimethylacrylamide bead optionally cross-linked with N,N'-bis-acryloyl ethylene diamine, a glass particle coated with a hydrophobic polymer, or a low molecular weight non-cross-linked polystyrene.

34. A library of nucleic acids comprising a plurality of nucleic acids, wherein each nucleic acid in the library is bound to an individual support, each support having associated therewith one or more populations of semiconductor nanocrystals, each population having a distinct characteristic spectral emission.

35. The library of claim 34, wherein each nanocrystal comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

36. The library of claim 34, wherein the characteristic spectral emission is a wavelength of emitted light, an intensity of emitted light, or both a wavelength and an intensity of emitted light.

37. A library of polypeptides comprising a plurality of polypeptides, wherein each polypeptide in the library is bound to an individual support, each support having associated therewith one or more populations of semiconductor nanocrystals, each

population having a distinct characteristic spectral emission.

38. The library of claim 37, wherein each nanocrystal comprises:

a core comprising a first semiconductor material; and

a shell layer overcoating the core, the shell comprising a second semiconductor material having a band gap greater than that of the core,

wherein the first semiconductor material and the second semiconductor material are the same or different.

39. The library of claim 37, wherein the characteristic spectral emission is a wavelength of emitted light, an intensity of emitted light, or both a wavelength and an intensity of emitted light.